

## SECTION 901

### SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

#### 901.1 GENERAL

The construction items, specified in this section, are common to sanitary sewer collector and interceptor facilities.

#### 901.2 REFERENCES

##### 901.2.1 ASTM

C 43	D 2321
C 425	D 3034
C 443	F 679
C 478	F 794

##### 901.2.2 AWWA

C 603

##### 901.2.3 This publication per SECTIONS:

101	123
102	124
105	125
106	129
108	701
121	

#### 901.3 MATERIALS

802.3.1 PIPE: Sewer line pipe and fittings shall be as specified in other sections, as follows:

Plastic Pipe	Section 117
Reinforced Concrete Pipe	Section 123
Reinforced Concrete Pressure Pipe	Section 124
Vitrified Clay Pipe	Section 125
Ductile Iron Pipe	Section 129

#### 901.4 CERTIFICATION

The OWNER/ENGINEER will be supplied with a certification on each item or type of material required in the sewer line, as to that item meeting the specifications and/or the reference specifications before that item is installed.

#### 901.5 INSTALLATION

##### 901.5.1 GENERAL:

901.5.1.1 Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as approved by these specifications or unless otherwise shown on the drawings. Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

901.5.1.2 The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after laying shall be replaced with sound pipe, or repaired in a manner satisfactory to the ENGINEER, without additional expense to the OWNER.

901.5.1.3 The CONTRACTOR shall install a plug in the new sewer at any point of connection to an existing system. The plug shall remain in place until the ENGINEER and Liquid Waste Division authorize its removal in writing. The CONTRACTOR shall not flush or otherwise discharge any flow into an existing system unless approved in writing by the ENGINEER.

901.5.1.4 Pipe shall be laid to line and grade as shown on the plans and as staked in the field. The bedding of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to the line and grade shall be made by scraping away or filling in with pipe zone material under the body of the pipe, and not by wedging or blocking. When connections are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the CONTRACTOR shall excavate for and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request the CONTRACTOR to excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans will be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the General Conditions.

901.5.1.5 Connections to existing manholes shall be made by core drilling through the manhole wall. The CONTRACTOR shall take care to avoid unnecessary damage to the existing manhole.

901.5.1.6 Pipe shall be laid upgrade in a continuous operation from structure to structure, with the socket or collar ends of the pipe upgrade unless otherwise permitted by the ENGINEER.

901.5.1.7 Sanitary sewer mains shall not be constructed under walkways, sidewalks, curbs and gutters, drivepads, or similar concrete structures by tunneling underneath them. The CONTRACTOR will cut these concrete structures by using a concrete saw or, at his option, he may remove the section of the concrete structure to the nearest full expansion joint or edge.

#### 901.5.2 PLASTIC PIPE INSTALLATION:

901.5.2.1 Plastic sewer pipe shall be connected and placed in the trench in accordance with the manufacturer's recommendations. Where a conflict arises with this Specification, this Specification shall control. Trenching, embedment, and backfill shall be as specified in Section 701.

901.5.2.2 The reference mark (a distinct circumferential line) is placed on the pipes spigot end by the manufacturer to indicate the correct depth of spigot penetration into the pipe gasket joint. If the pipe is seated too deep or too shallow the pipe may buckle or separate due to thermal expansion/contraction. Spigot penetration shall be within 1/4" of the manufacturer's recommended mark.

901.5.2.3 For plastic pipe connection to manholes the CONTRACTOR shall install an appropriately sized press seal gasket, such as PS-10 by Press Seal Gasket Corporation, Large Diameter Waterstops for Concrete Manhole Adapters by Fernco, or approved equal. The gasket shall be installed per manufacturer's directions. No direct payment shall be made for this item; this cost shall be included in the pipe bid item price.

901.5.2.4 Not less than thirty (30) days after the installation and backfilling of plastic sewers, including any service connections, the CONTRACTOR shall, in the presence of the ENGINEER, test deflection of the pipe with a mandrel (GO-NOGO device). The mandrel shall be hand pulled. All pipe with deflections in excess of five (5) percent of the base internal diameter, as determined by ASTM

D 3034, ASTM F 679, or ASTM F 794 shall be excavated, rerounded, backfilled and retested after an additional period of at least thirty days. Mandrels shall have 9 ribs and be only hand pulled through the test section. The CONTRACTOR shall furnish the mandrels. The length of the minimum radius portion of the mandrel shall not be less than the one-third of the nominal diameter of the pipe tested. The pipe shall be flushed and cleaned by the CONTRACTOR prior to testing. No flow will be permitted in the pipe while testing for deflections.

901.5.2.5 All expense for trenching, backfill, compaction, paving, and related work that is required because of failure to meet deflection test requirements shall be borne by the CONTRACTOR.

901.5.2.6 Acceptance of plastic pipe sewers will be made only after these deflection test requirements have been met.

#### 901.5.2.7 Minimum Diameters of Mandrels

##### 901.5.2.7.1

<u>Nominal Pipe Size</u>	<u>Min. Mandrell Diam.</u>
8 in.	7.28 in.
10 in.	9.08 in.
12 in.	10.80 in.
15 in.	13.20 in.
18 in.	16.13 in.
21 in.	19.00 in.
24 in.	21.36 in.
27 in.	24.07 in.

#### 901.6 JOINTS FOR PIPE

901.6.1 JOINTS FOR CLAY PIPE (FACTORY FABRICATED AND INSTALLED COMPRESSION-TYPE JOINTS FOR VITRIFIED CLAY PIPE):

901.6.1.1 Joint material shall be any one of the types specified in ASTM C 425 and shall meet all requirements of that specification and Section 125.

901.6.1.2 The CONTRACTOR shall furnish the ENGINEER complete information concerning the type and make of all joint material which he intends to use under the contract including certification that the joint material meets the requirements of these specifications.

901.6.1.3 In addition to all other tests required, the ENGINEER may select at random and perform the test on 2 joints for

each 250 feet of pipe or fraction of each size of any lot of pipe to be tested.

901.6.1.4 The pipe joints shall not leak when subjected to the shear loading and hydrostatic tests as per ASTM C 425.

#### 901.6.2 JOINT FOR CONCRETE PIPE:

901.6.2.1 The type of joint to be used shall be as shown on the drawings or as specified in the Supplementary Specifications.

901.6.2.2 Gasketed type of joints for reinforced concrete pipe shall be used.

901.6.2.3 The ends of the pipe shall be so formed that when the pipes are laid together and joined, they shall make a continuous and uniform line of pipe with a smooth and regular surface.

901.6.2.4 Rubber gaskets for making compression type joints for concrete pipe shall be factory fabricated in accordance with ASTM C 443 and C 361; for pipes 12 inches in diameter and larger shall be O-Ring and shall be handled, primed, installed, etc. in strict accordance with the manufacturer's recommendations.

901.6.2.5 The CONTRACTOR's attention is particularly called to ASTM C 443, regarding storage of gaskets.

901.6.2.6 The sealing of the plastic liner at the pipe joints shall be in strict accordance with Section 122.

901.6.2.7 The CONTRACTOR shall furnish the ENGINEER complete information concerning the type and make of all joint material which he intends to use under the contract,, including certification that the joint material meets the requirements of these specifications.

#### 901.6.3 JOINT FOR PLASTIC SEWER PIPE (PVC):

901.6.3.1 Refer to ASTM D 2321 and ASTM F 794 for pipe laying and joining of pipe guidelines.

901.6.3.2 Prior to the laying of pipe, each pipe component shall be inspected for damage and cleaned. Damaged components shall be rejected or repaired.

901.6.3.3 All joints will be assembled in accordance with manufacturer's published recommendations. If a lubricant is required to facilitate assembly, it shall have no detrimental effect on the gasket or on the pipe when subjected to prolonged exposure. Proper jointing may

be verified by rotation of the spigot by hand or with a strap wrench. If unusual joining resistance is encountered or if the insertion mark does not reach the flush position, disassemble the joint components and repeat the assembly steps. Note that fitting bells may permit less insertion depth than pipe bells. When mechanical equipment is used to assemble joints, care should be taken to prevent over insertion.

#### 901.7 TESTING FOR LEAKAGE

##### 901.7.1 GENERAL:

901.7.1.1 Unless otherwise shown on the drawings or specifically deleted by the ENGINEER, in writing, all sanitary sewers shall be tested for leakage.

901.7.1.2 The CONTRACTOR may, at his option, Air Test the sanitary sewer line before backfilling the trench to aid the CONTRACTOR in checking the installation for any defects. Such testing is at the option of the CONTRACTOR and shall not constitute an acceptance test under these specifications.

901.7.1.3 The test for acceptance and compliance with these specifications shall be performed after the pipe zone backfilling has been completed. In the case of new sanitary sewer lines with house laterals included as an integral part of the project, the test for acceptance and compliance with these specifications shall be performed after the house laterals or stubs have been completed and backfilled. The CONTRACTOR has the option to leave the end of the service line exposed.

901.7.1.4 If the leakage, as shown by the test, is greater than allowed by these specifications, the pipe shall be overhauled by the CONTRACTOR at his expense and, if necessary, relaid until the pipe will satisfactorily pass the test.

901.7.1.5 The CONTRACTOR shall, at his own expense, furnish all water, material, tools and labor for making the test required. All tests shall be made under observation of the ENGINEER.

##### 901.7.2 INFILTRATION TEST:

901.7.2.1 An Infiltration Test shall be used only when excessive ground water prevents satisfactory testing by either the Exfiltration Test or the Air Test. In addition, the Infiltration Test must be performed after backfilling, before any service connections are functioning and at a time when the ground water is

over the entire section of pipe and at or near its maximum level.

901.7.2.2 The procedure for conducting an Infiltration Test shall be as follows:

901.7.2.2.1 The pipe section shall be cleaned.

901.7.2.2.2 Determine the groundwater table. The groundwater table shall be determined for each section of sanitary sewer tested.

901.7.2.2.3 Plug the upstream pipe outlet from upstream manhole of the sections being tested with a plug which will assure a tight seal against flow from the upstream portion of the sewer system. Also plug all house laterals and any other connections to the section being tested.

901.7.2.2.4 Install a 90 degree V-notch weir in the downstream manhole of the section being tested. Weir must be installed plumb and sealed to the pipe wall surface.

901.7.2.2.5 A sufficient period of time must be allowed to permit the infiltrated waters to collect and flow over the weir. Water shall flow over the weir for at least thirty minutes prior to taking measurements.

901.7.2.2.6 The head (H) of water flowing over the weir must be measured accurately and the measurement taken at least 18 inches upstream from the crest of the weir.

901.7.2.2.7 Discharge over the 90 degree V-notch weir shall be calculated according to:

$$Q = 3240 H^{2.5}$$

H = Head in inches

Q = Discharge in gallons per day

901.7.2.3 The allowable infiltration shall be 200 gallons per inch of pipe diameter per mile of pipe per day. When there is significantly more than two feet of groundwater above the top of the pipe at the highest point of the section being tested, ten percent additional infiltration above the permitted 200 gal/in.-dia/mi/day limit will be allowed for every 2 foot of additional head.

#### 901.7.3 EXFILTRATION TEST

901.7.3.1 An Exfiltration Test may be conducted wherever the groundwater level is below the crown of the pipe at the highest elevation of the section of

sanitary sewer being tested. If the groundwater level is above the crown of the pipe either the Air Test, properly adjusted, or Infiltration Test should be used.

901.7.3.2 The procedure for conducting an Exfiltration Test shall be as follows:

901.7.3.2.1 The pipe section shall be cleaned.

901.7.3.2.2 Plug the downstream pipe outlet to the manhole with a plug which will assure a tight seal against water leakage. Also plug all house laterals and any other connections to the section being tested.

901.7.3.2.3 If the upstream manhole is to be used as a reservoir for maintaining the pressure head on the sewer pipe, the inlet sewer pipe or pipes must be plugged. If a standpipe is to be used as a reservoir for maintaining the pressure head on the sewer pipe, the standpipe must be connected to the sewer pipe in the upstream manhole by a tightly sealed connection.

901.7.3.2.4 The amount of water (volume required to fill the section of sewer under test plus the manhole or standpipe) shall be calculated.

901.7.3.2.5 Water shall then be introduced through the manhole or standpipe. The amount of water introduced shall be metered. The amount of water introduced to fill the sewer should be approximately equal to the calculated amount. If the amount of water required to fill the sewer pipe is significantly greater than the calculated amount, it is an indication of a leak or leaks and consequent saturation of the backfill around the sewer pipe. Saturation of the backfill will invalidate the test.

901.7.3.2.6 The level of water in the manhole or standpipe shall be at least two feet above the crown of the pipe at the highest section of the section of sanitary sewer being tested.

901.7.3.2.7 After filling the pipe at least one hour shall be allowed for water absorption in the pipe. For some materials, up to six hours may be required. After the absorption period, the manhole or standpipe shall be refilled to the established measuring mark and the test begun.

901.7.3.2.8 If the upstream manhole is used as a reservoir for maintaining the pressure head on the sewer pipe, the dif-

ference in water surface elevation from original to final level in a two hour period shall be used to calculate the water lost. The water lost in the two hour period shall be converted into gallons per day. If a standpipe is used as a reservoir for maintaining the pressure head on the sewer pipe, the standpipe shall be refilled periodically during the two hour test period to maintain an essentially constant head on the test section of pipe. The amount of water added shall be measured and shall be used to calculate the loss in gallons per day.

901.7.3.2.9 The allowable exfiltration shall be computed based upon the average pressure head above the crown of the pipe for the section tested as follows:

$$\text{Allowable leakage} = \frac{\sqrt{h}}{\sqrt{3}} \times 200$$

Allowable leakage in gallons per inch of pipe diameter per mile of pipe per day.

h = average pressure head above the crown of the pipe, in feet  
(elevation of water at center of run)

901.7.3.2.10 When the upstream manhole is used as a reservoir for maintaining the pressure head, the allowable leakage from the manhole shall be added to the allowable leakage calculated for the sewer pipe.

901.7.3.2.11 If the sanitary sewer line fails to pass the Exfiltration Test, a re-test shall be permitted only after the groundwater conditions surrounding the pipe return to a condition similar to those existent at the beginning of the test period. The groundwater elevation shall be determined prior to initiation of the second test.

#### 901.7.4 AIR TEST:

901.7.4.1 An Air Test may be conducted under all conditions of groundwater levels surrounding the sanitary sewer pipe. If the groundwater is above the crown of the pipe, the air pressure shall be increased by an increment equal to the pressure exerted by the groundwater over the pipe.

901.7.4.2 The procedure for conducting an Air Test shall be as follows:

901.7.4.2.1 Clean the pipe section (manhole to manhole reach of sewer) being tested by propelling a snug-fitting inflated ball, or other adequate method, through the pipe with water. It is

important that the pipe be thoroughly wetted if consistent results are to be expected.

901.7.4.2.2 Plug all pipe outlets with pneumatic plugs. The pneumatic plugs shall be able to resist internal testing pressures without requiring external bracing. Give special attention to house laterals.

901.7.4.2.3 Determine the groundwater level surrounding the section of sewer under test. If the groundwater level is above the crown of the pipe, the test pressures shall be increased by 0.43 psig for each foot of water above the average elevation of the crown of the pipe. Test pressures shall not exceed 10 psig.

901.7.4.2.4 Introduce air slowly to the section of pipe under evaluation until the internal air pressure is raised to 4.0 psig plus any increase required by a high groundwater level.

901.7.4.2.5 Allow the air pressure to stabilize. Air may be added slowly to maintain a pressure in the 3.5 to 4.0 psig (plus groundwater allowance) for two minutes.

901.7.4.2.6 After the stabilization period, when the pressure reaches exactly 3.5 psig (plus groundwater allowance) the stopwatch is started and when the pressure reaches exactly 2.5 psig (plus groundwater allowance) the stopwatch is stopped.

901.7.4.2.7 If the time required for a one pound pressure drop is not less than the allowable time for the pipe section under test to lose air, the section shall pass the leakage test.

901.7.4.2.8 In all cases where an Air Test is conducted, the manholes shall be tested separately as previously specified.

901.7.4.2.9 All persons conducting an Air Test must be made aware of the fact that an Air Test may be dangerous if improperly conducted.

901.7.5 AIR TESTING TABLES: Tables 901.7.5.1 and 901.7.5.2 will be used to determine the required test duration for the section of line being tested.

#### 901.8 CLEANING AND INSPECTION

901.8.1 CLEANING: No pipe spalls, rocks, dirt, joint compounds, cement mortar and other trash or obstructions shall be left in a sewer pipe of any size or type. During the flushing operations the

TABLE 901.7.5.1

SPECIFICATION TIME REQUIRED FOR 1.0 PSIG PRESSURE  
DROP FOR SIZE AND LENGTH OF PIPE  
INDICATED FOR Q=0.0015

(A) Pipe diam- eter (in.)	(B) Mini- mum Time (min: sec)	(C) Length for Mini- mum Time (ft)	(D) Time for length (sec)	(E) Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

Table from: UNI-B-6-79, "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe"; Uni-Bell Plastic Pipe Assoc.

TABLE 901.7.5.2

SPECIFICATION TIME REQUIRED FOR LOSS OF PRESSURE  
FROM 3.5 PSIG TO 2.5 FOR SIZE AND  
LENGTH OF PIPE INDICATED FOR Q=0.003

(A) Pipe Diam- eter (in.)	(B) Mini- mum Time (min: sec)	(C) Length for Mini- mum Time (ft)	(D) Time for length (sec)	(E) Specification Time for Length (L) Shown (min:sec)									
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft		
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:50	2:50	2:50	2:50
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:47	3:47	3:47	3:47	3:47	3:47
10	4:43	239	1.187 L	4:43	4:43	4:43	4:43	4:43	4:43	4:43	4:43	4:43	4:43
12	5:40	199	1.709 L	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40
15	7:05	159	2.671 L	7:05	7:05	7:05	7:05	7:05	7:05	7:05	7:05	7:05	7:05
18	8:30	133	3.846 L	8:30	8:30	8:30	8:30	8:30	8:30	8:30	8:30	8:30	8:30
21	9:55	114	5.235 L	9:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55
24	11:20	99	6.837 L	11:20	11:20	11:20	11:20	11:20	11:20	11:20	11:20	11:20	11:20
27	12:45	88	8.653 L	12:45	12:45	12:45	12:45	12:45	12:45	12:45	12:45	12:45	12:45
30	14:10	80	10.683 L	14:10	14:10	14:10	14:10	14:10	14:10	14:10	14:10	14:10	14:10
33	15:35	72	12.926 L	15:35	15:35	15:35	15:35	15:35	15:35	15:35	15:35	15:35	15:35
36	17:00	66	15.384 L	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00
39	18:25	61	18.054 L	18:25	18:25	18:25	18:25	18:25	18:25	18:25	18:25	18:25	18:25
42	19:50	57	20.039 L	19:50	19:50	19:50	19:50	19:50	19:50	19:50	19:50	19:50	19:50

Table from: WPCF Journal, Vol. 44, No. 4, April 1972; Ramseyer, "Testing New Sewer Pipe Installations"; pp. 557-564.

### 901.7.5.3 EXPLANATION AND USE OF TABLES

#### Explanation of Tables

- Column A Nominal diameter of pipe (any pipe material).
- Column B Minimum duration of air test regardless of length of line segment being tested. (e.g., 250' of 8" PVC: test duration 3 min. 47 sec.)
- Column C Length of Line associated with minimum duration of air test (Column B).
- Column D  $L$  = length of line in feet; product of computation yields duration of air test (e.g., 250' of 12" PVC where ground water is not present ([Table 901.7.5.1]: test duration-- $1.709 (250) = 427.25$  sec. = 7 min. 8 sec.)
- Column E Duration of air test for given incremental lengths of line.

#### Use of Tables

Table 901.7.5.1 is based on an air loss rate of 0.003 cfm/sf of internal surface area. Use for line installations where ground water (and subsequent infiltration is not present.

Table 901.7.5.2 is based on an air loss rate of 0.0015 cfm/sf of internal surface area. Use for line installations where ground water (and subsequent infiltration) is present.



manhole outlet shall be bagged or plugged so that this debris will not be carried into or contaminate an existing or active line.

#### 901.8.2 TELEVISION:

901.8.2.1 All completed sewer lines shall be inspected by a television camera before lines become operational or final acceptance of the installation.

901.8.2.2 After the CONTRACTOR has cleaned flushed and retrieved all debris in the line, the CONTRACTOR will notify the project engineer that the line is ready for television inspection. The CONTRACTOR in the presence of the ENGINEER or the engineer's representative shall televise the line with televising equipment specifically designed and constructed for sewerline visual inspection.

The television camera shall be of color and equipped with a rotating lens capable of 360-degree rotation with zoom focus and a wide-angle optical lens permitting spontaneous focal adjustments, allowing viewing of service lateral connections, joints, pipe walls, etc.

A television report log, completed on the OWNER'S log form, shall be maintained during the television inspection. This log shall be completed to the OWNER'S satisfaction noting the location, project title, name of OWNER, date, type of pipe material, line size, location of services (live or stubouts), manhole or station numbers, and any abnormal or line defects within the line segment. The CONTRACTOR shall be responsible for subsequent televising when line repairs are required or when the previous televising is not satisfactory to the OWNER.

When the televising is complete, the CONTRACTOR shall turn over to the OWNER complete television report logs and the VHS videotape recordings.

#### 901.9 MEASUREMENT AND PAYMENT

901.9.1 SANITARY SEWER PIPE: Installed pipe shall be measured and paid for as follows:

901.9.1.1 For straight lines the pipe length shall be the intervening distance between the centers of manholes along a line parallel to the pipe invert.

901.9.1.2 For curvilinear lines the pipe length shall be the intervening arc distance between the centers of manholes along a line parallel to the pipe invert.

901.9.1.3 For lateral lines, such as from main or manhole to a storm inlet, the pipe length shall be the distance between the center of a manhole or centerline of the main to the interior wall face of the storm inlet along a line parallel to the pipe invert.

901.9.1.4 Payment for pipe will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include: pipe installed in the trench, jointing and coupling materials, and other materials necessary to connect to other sections of pipe, manholes, and other appurtenances.

901.9.2 CONNECTIONS: Connections, tying new sewer lines into existing manholes, shall be measured and paid for on a unit price per each within the size increments as specified in the Bid Proposal. Connections to the shelf section of the floor will not be considered for payment under this bid item.

901.9.3 VERTICAL DROPS: Vertical drops at manholes shall be measured by the linear foot of pipe from the invert of the sewer line to be dropped to the spring line of the receiving main. Payment will be made on the unit price per linear foot per size and type of pipe as specified in the Bid Proposal.

#### 901.9.4 TESTING:

901.9.4.1 Infiltration, exfiltration, and air tests of sewer mains shall include sewer service lines to the property lines or right-of-way lines as installed per the construction plans. No payment will be made for the initial test or subsequent tests.

901.9.4.2 Television inspection is defined in Subsection 801.8.2.

901.9.4.3 There will be no payment for required testing of sanitary sewer manholes.

901.9.4.4 No payment will be made for deflection tests after the required waiting period for PVC sewer pipe installations.

901.9.5 REMOVAL AND DISPOSAL OF SEWER PIPE: Removal and disposal of sanitary or storm sewer lines shall be measured by the linear foot within the specified pipe size increments. Payment will be made on the unit price per linear foot of specified pipe size in the Bid Proposal. No payment will be made until delivery of salvageable materials is verified by Liquid Waste Division. Trenching, backfilling, and pavement removal and replacement will be paid for based on the unit prices for each appropriate bid item in the Bid Proposal. If new pipe is to be installed in the same trench as the removed pipe, only one payment will be made for trenching, backfilling, and pavement removal and replacement.